REPRODUCING POWER OF WELL-FILLED VS. POORLY-FILLED EARS OF MAIZE

THESE tests were conducted to determine the effects, if any, on the progeny, particularly as to productivity, when a stalk of corn is caused to produce comparatively few kernels instead of a normal-sized, well-filled ear. In other words, the object was to learn whether artificially reducing the possible number of progeny kernels would have any influence on their viability, vigor or ability to yield.

In selecting seed corn, ears are occasionally found which evidently would have been much larger and better filled had not something such as an overhanging blade or an insect interfered with pollination. Are such ears suitable for seed?

Similar tests were conducted with three varieties, one being a cross-bred variety. The three classes of seed for these tests were grown in 1914 and their comparative productiveness tested in 1915. The seed of U. S. Selection 77 was grown and tested at Piketon on river-bottom soil in Southern Ohio, and that of the other two varieties at Broad Run on Piedmont clay of Northern Virginia.

METHODS OF PROCEDURE

Two methods were used to control the pollination and consequent seed production of the poorly filled ears. In one case, the first silks to appear were about an inch beyond the end of the shoots when the shoots were bagged to prevent further pollination. In the other case, the ear shoots were bagged before the silks began to appear. When all the silks had protruded several inches the bags were removed for half an hour and then replaced. This was done when pollen was falling freely. A few of the uncovered silks thus became naturally pollinated.

The first method produced ears the butt ends of which were fairly well filled for about one fourth the length of the cob. The second method gave ears that had a few large rounded kernels scattered over the cob. As check seed for the tests, large, well-filled, typical, seed ears that had been allowed to mature unmolested were selected. The seed ears of the three lots of each variety were selected from the same rows from similar stalks grown under like conditions as far as possible. The drying, care, etc., were the same for each of the three lots.

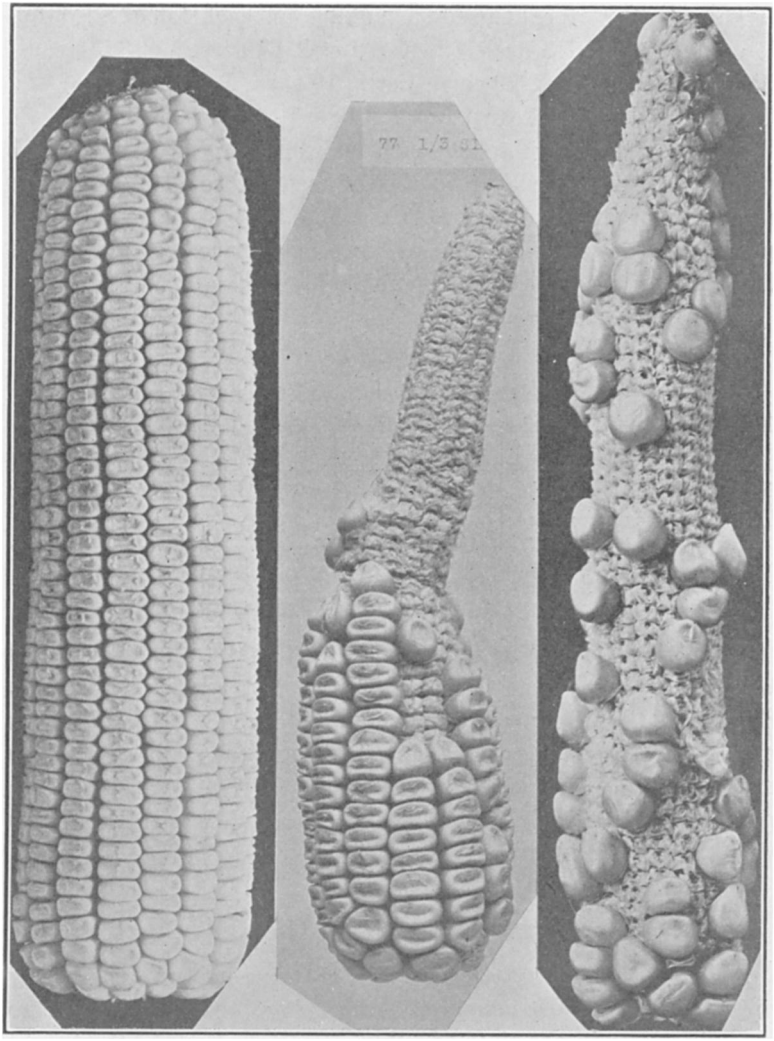

FIG. 1. Comparative productivity tests were conducted with lots of seed taken from the three kinds of ears here represented.

The seed from the check ears will be referred to as such while that from the ears filled only at the butt ends, as Lot 2, and that from the ears with kernels scattered over the cob as Lot 3.

The number of ears used in making up each lot of seed follows: Selection 77, Check, 62 ears; Lot 2, 67 ears; Lot 3, 54 ears; Selection 119, Check, 26 ears; Lot 2, 19 ears; Lot 3, 26 ears; and Cross 182, Check, 26 ears; Lot 2, 14 ears; and Lot 3, 19 ears.

In preparing for planting each lot was composited in the following manner. The same number of kernels was taken from each ear of a lot and these kernels combined made just enough to plant one row 50 hills long. The comparative weights of the three lots of seed are given in Table I.

TABLE I

WEIGHTS IN GRAMS OF 265 KERNELS OF EACH LOT OF SEED

Variety	Check Seed	Lot 2	Lot 3
Selection 77	124	141	137
Selection 119	118	122	127
Cross 182	126	148	151

DATE AND METHOD OF PLANTING

U. S. Selection 77 was planted May 1, 1915. The three lots were planted in adjacent rows and the test repeated 14 times. Selection 119 and Cross 182 were planted May 3, 1915. The lots of these two varieties were planted in the same order as the lots of Selection 77, but only 15 rows each of these two varieties were planted. The planting was done by hand and later all the rows were thinned to a uniform stand.

OBSERVATIONS DURING GROWTH

At no stage during the growth of the corn was there any noticeable difference among the three lots. Neither was there any difference in the time of silking and tasseling, in the height of stalk, nor in time of maturing. There was a slight difference in the field germination of the three lots of seed as shown in Table II., but these differences within the varieties are not great enough to be significant nor are they consistent for the three varieties.

TABLE II

Variety	Lot	Field Germination, Per Cent.	Ave. Weight of the Ears Produced, Pounds	Total No. of Stalks	Total Yield of Ears, Pounds	Corrected Yield per Acre, Bushels
Selection 77.....	Check	87.6	0.763	1,725	1,292.0	96.7
	2	86.6	0.736	1,738	1,228.0	89.9
	3	86.6	0.761	1,723	1,277.0	94.5
Selection 119....	Check	84.5	0.592	481	308.1	74.8
	2	84.5	0.586	472	283.1	70.9
	3	79.7	0.585	494	290.6	69.7
Cross 182.....	Check	83.8	0.682	503	346.4	80.1
	2	88.3	0.635	507	321.2	74.8
	3	80.8	0.662	510	331.4	77.0

RESULTS

The yields in Table II. are all based on field weights at harvest time. With all three varieties the well-filled seed ears produced the highest yields, the increase being from 2.2 to 3.9 bushels per acre over the next highest lot. In the 25 comparisons between the two lots, Checks outyielded Lot 3, its nearest competitor, 16 times, with one tie; and it outyielded Lots 2, 20 times with two ties.

Previous work had proved Cross 182 more productive than Selection 119. In the tests reported in Table II. they occupied the same amount and kind of soil and Cross 182 is consistently more productive than Selection 119.

Regarding all three varieties the ears harvested from each of the three lots of seed were equally well-filled and of the same general appearance. These tests warrant the conclusions that ears poorly-filled by reason of withheld pollen will not transmit this character to their progeny, and can be expected to supply seed almost as productive, if not as productive, as they would have supplied if completely pollinated.

C. P. HARTLEY,
H. S. GARRISON

U. S. DEPARTMENT OF AGRICULTURE